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Properties of an ideal burn dressing: A survey of burn survivors and front-line burn healthcare providers

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ABSTRACT

Objectives: The objective of this study is to identify what burn survivors and front-line staff indicate would improve satisfaction with burn dressings, and the ranking of importance of different burn dressing characteristics. These findings will guide the development of future dressings to meet these needs.

Methods: Burn survivors (including the person injured and their family) and front-line burn healthcare providers completed a questionnaire on the importance given to different burn dressing characteristics (non-stick, absorbent, able to wear for a long time, flexible, easy to put on, easy to take off, antimicrobial, and non-bulky), and about the adequacy of pain management during dressing changes.

Results: A total of 99 individuals filled out the questionnaire (31 caregivers/survivors and 68 front-line burn healthcare providers). The most important dressing characteristics by both groups were “non-stick” and “fights infection”. There was a significant difference between burn survivors and front-line burn healthcare providers pertaining to adequacy of pain management during dressing change. Adequate pain management was reported by 59% of burn survivors, which was significantly higher than that reported by the 25% front-line burn healthcare providers ($p=0.002$).

Conclusions: Our study suggests that burn survivors and front-line burn providers have similar views on what constitutes an ideal dressing. A significantly proportion of caregiver/survivors felt that pain associated with dressing changes is being adequately managed despite healthcare providers' perception.

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1. Introduction

The skin is the largest organ in the body and aids in maintenance of body temperature and fluid balance, as well as protecting the body from environmental dangers [1]. When an individual is injured beyond the epidermis, the integumentary system may no longer fulfill these functions and dressings are indicated until the skin heals. Historically the ideal burn dressing has been described as having 3 main functions [2]; to provide comfort, to reduce fluid loss and to protect from the environment. How to achieve these functions is open to interpretation. A survey by Hermans reported a wide variety of dressings are used throughout the world whereby each dressing purports to address attributes of an ideal burn dressing [3].

Selig et al. published a survey of 121 burn care providers to understand what burn professionals feel the essential and desirable characteristics of a burn dressing might be [4]. The dressing characteristic ranked most desirable was a pain-free dressing (ranked essential by 55%), followed by lack of adhesion (46%). Daily dressings were found least desirable (9.3%) with twice weekly most desirable (36%). Nearly all respondents felt that no single dressing met all the characteristics of an ideal dressing. In Selig's study, however, over 80% of the responders were physicians and only 17% were nursing

staff, with no survivors of burn injury in the respondents. It is possible that those with lived experience from burn dressings, such as burn survivors, including the patient and their immediate family members may have a different opinion than burn physicians as to the ideal characteristics of a burn dressing.

Additionally, the experience of the healthcare providers who perform the dressing changes may be different than physicians who may not be present for the entire dressing change. Given the paucity of research focusing on the perspective of those with lived burn experience; a survey inspired by the work of Selig et al. [4], Kamolz et al. [5] and Wasiak et al. [6] was created and circulated to burn survivors and front-line burn healthcare providers.

2. Methods

Institutional ethics approval was obtained prior to initiating the project. A questionnaire (Table 1) was created by a team of burn care specialists (including burn surgeons, burn nurses, and plastic surgery residents). The survey was vetted through a group of burn survivors and front-line burn healthcare providers to ensure that the questions addressed the perceived needs and to ensure adequate readability. The voluntary survey was distributed through the regional burn unit and the

Table 1 – Questionnaire overview.

Questions	Answers	Answer type
1. Which of the following describes you?	1. Burn survivor (injured as a child) 2. Burn survivor injured as an adult 3. Family member/care giver of burn survivor a. spouse, b. parent, c. sibling, d. child 4. OT/PT 5. MD 6. Nurse 7. Other	Single choice
2. Thinking about a burn injury, please circle which response best applies: a. How important is a dressing that does not stick to the burn wound? b. How important are pain-free dressing changes? c. How important is it that the dressing absorbs drainage? d. How important is the ability of a burn dressing to fight infection? e. How important is it that the dressing stays in place?	1. Very important 2. Important 3. Moderately important 4. Of little importance 5. Unimportant	Single choice for each question 2a-e
3. Please rank the following dressing characteristics in order of importance: a. Non-stick b. Absorbs drainage c. Able to wear dressing for a long time d. Flexible dressing e. Easy to put on f. Easy to take off g. Fights infection h. Non-bulky	“1=very important” through “8=least important”	Ranking order
4. Do you feel that pain is/was adequately managed during dressing changes?	Yes, No, Sometimes	Single choice

regional annual burn survivors' conference. The data for the survey was collected from October 2012 to April 2014. In question 2, participants were asked think about a burn injury and rate from "1. very important", "2. important", "3. moderately importance", "4. of little importance" or "5. unimportant" of the importance of characteristics for a burn dressing. Initially responses were sought for each characteristic independently. Responses for this question were transformed into a binary variable, "important" consisting of "1. very important", "2. important" and "not important" consisting of "3. moderately importance", "4. of little importance" or "5. unimportant". In question 3, participants were asked to rank (without replacement) 8 characteristics (a. Non-stick, b. Absorbs drainage, c. Able to wear dressing for a long time, d. Flexible dressing, e. Easy to put on, f. Easy to take off, g. Fights infection, h. Non-bulky in order of importance).

Respondents were also asked to rank the various characteristics in order of importance and describe the whether or not pain was adequately managed during dressing changes. Responses were compared between burn survivors and burn care providers using Mann-Whitney U and Pearson Chi Square Test. Groups differences were considered significant when $p < 0.05$ (two-tailed).

3. Results

A total of 99 participants (31 caregivers/survivors and 68 front-line burn healthcare providers) completed the survey (Table 2). We estimate approximately 40 healthcare providers on the ward and 60 in the ICU for a response rate of approximately 68/100 (68%). There were estimated 70 attendees at the burn survivor conferences, yielding a response rate of approximately 31/70 (44%). Participants were asked to think about characteristics of a burn dressing in the context of a burn injury (Fig. 1). The sentiments of the 2 groups were similar, aside from 100% of survivors ranking "How important is a dressing that fights infection?" and "How important is a dressing that stays in place?", compared to 91.2% and 92.6% for front-line burn healthcare providers, respectively.

Participants were next asked to rank a set of burn dressing characteristics in order of importance (Table 1, question 3). Both study groups ranked the characteristics in the same order of importance from least important to most important; "non-

bulky", "able to wear dressing for a long time", "easy to put on", "flexible", "easy to take off", "absorbs drainage", "fights infection", and "non-stick". There was no statistically significant difference in the ranking order of these groups (Table 3). The most important characteristic as viewed by both burn survivors and providers was the dressing be 'non-stick'. This was followed by 'fights infection'. Our survey showed that the 75% of front-line burn healthcare providers perceived that dressing pain management is inadequate despite caregivers/burn survivors perceiving pain to be adequately managed during dressing changes (Table 4).

4. Discussion

Burn care is complex, and benefits from a multidisciplinary approach to ensure optimal patient outcomes. Patients with burn injuries often experience significant psychological stress, which further decreases their ability to cope with burn dressings [7]. This can lead to depression, maladaptive coping strategies, or post-traumatic stress syndrome [8,9]. Despite the efforts that a burn team may allocate to a patient, the patient plays a pivotal role in their own recovery and it is crucial to empower patients in this process. Therefore, involving burn survivors is essential in the understanding of the ideal characteristics of burn dressings.

In this study, burn survivors and front-line burn healthcare providers assigned the same importance to the dressing characteristics. This is an important step in the evolution of burn dressings based on the characteristics considered most important by front-line burn healthcare providers. The two most important characteristics for both groups were "Non-stick" and "fights infections". The third most important characteristic for burn survivors was "absorbs drainage", while that for front-line burn healthcare providers was "easy to take off". Although they did not use a ranking scale, Selig et al. [4] also found that non-adherence, absorbency and anti-microbial activity were among the most sought-after properties. There are some interesting differences between the level of importance on dressing characteristics placed by survivors compared to frontline care providers and also in comparison with the predominantly physician respondents of Selig's survey. When the importance of the different qualities of the dressings is examined, a greater proportion of survivors indicated 'Pain free' was not important (6.7%) compared to front-line staff (1.5%). This is also higher than Selig's report that 100% of respondents indicated that 'pain free' was either 'Essential' or 'Desirable'. Similarly, 100% of Survivors felt that 'a dressing that fights infection' was important compared to only 91.2% of care givers, or 83.5% of Selig's respondents ('Essential' or 'Desirable'). As well a greater proportion of survivors felt that a dressing that 'stays in place' was important compared to healthcare workers (100% vs 92.6% respectively).

Additionally, while Selig found that it was important to keep dressings in place for longer time periods, survivors and healthcare providers rated the ability to wear a dressing for a long time as one of the lowest priorities, only higher than being 'non-bulky'. Surprisingly, front-line burn healthcare providers underestimated the adequacy of

Table 2 – Respondent distribution.

Group (n; %)	Subgroup (n; %)
Front-line burn healthcare providers (68; 69%)	Nurse (52; 76%)
	Occupational therapist or physio-therapist (7; 10%)
	Physician (6; 9%)
	Other (3; 4%)
Caregiver/survivor (31; 31%)	Survivor, injured as adult (23; 74%)
	Survivor, injured as child (3; 10%)
	Parental caregiver (1; 3%)
	Spousal caregiver (3; 10%)
	Unspecified (1; 3%)

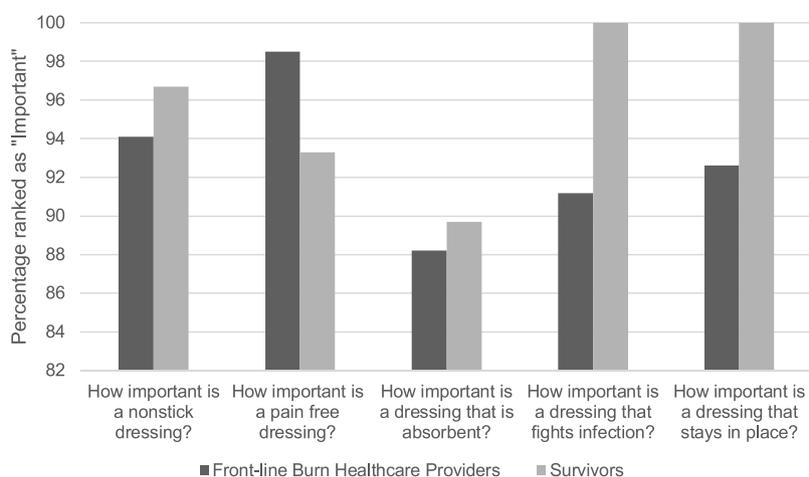


Fig. 1 – Ranked importance of dressing characteristics by front-line burn healthcare providers and survivors.

Table 3 – Dressing characteristics comparative ranking.

Question	Burn survivor	Front-line burn healthcare providers	p-Value
a. Non-stick	1st	1st	0.979
g. Fights infection	2nd	2nd	0.673
b. Absorbs drainage	3rd	4th	0.519
f. Easy to take off	5th	3rd	0.063
d. Flexible dressing	4th	5th (tie)	0.157
e. Easy to put on	6th	5th (tie)	0.567
c. Able to wear dressing for long time	7th	7th	0.536
h. Non-bulky	8th	8th	0.447

Table 4 – Pain management during burn dressing change is adequate.

	Burn survivor	Front-line burn healthcare staff	p-Value
Yes	59.3%	25.4%	0.002
No/ Sometimes	40.7%	74.6%	

dressing change pain management. Interestingly this differs from published findings suggesting that nurses may underestimate patient pain as a mechanism to cope with dressing changes [7]. This finding may be useful to front-line burn healthcare providers to better understand the effect of their care on patients and may help reduce nursing burnout associated with burn care.

5. Limitations

One of the limitations of this study is the grouping of caregivers/burn survivors and immediate family members in the same group analysis, as those that have lived experience

may have different perspectives from those supported them through the experience such as spouses or parents. The reason these individuals were aggregated for analysis was because patients have been frequently observed discussing and answering the questionnaire with their family members, incorporating their feedback into the responses. Often the survivor relies on the reports of family members to help them remember events when they were in the intensive care unit or sedated. Pain is also perceived differently by different people and with a larger sample subgroup analysis about patient age and gender could be revealing. As well, the burn size and location may change the importance of certain dressing characteristics. Further studies to determine the ideal burn dressing per burn size and location are needed.

6. Knowledge translation

This is one of the first studies to include burn survivors' sentiment about burn dressings that addresses their needs. Thus, this study will aid in development of future dressings to meet these needs. Future direction in the development of wound dressings should consider patient-related outcome measures including quality of life, satisfaction with the application and removal of dressings as well as the perceptions of the most painful aspects of burn wound care. For survivors and frontline caregivers alike the most important features are that a dressing is non-stick, and fights infections. These findings have started to change the care given at our center and has spurred new research. This includes expanding this study to a multi-center survey which will allow us to examine differences between subgroups of respondents i.e. differences in responses between nurses and physicians.

7. Conclusions

Our study suggests that burn survivors, caregivers and front-line burn healthcare providers have similar views on what

constitutes an ideal dressing and these views differ from those reported in a survey of predominantly physicians. The views of burn survivors and front-line burn healthcare providers should be considered when developing new burn dressings as these are the persons who most benefit from these changes. In addition, pain associated with dressing changes appears to be adequately managed by front-line burn healthcare providers despite health providers' perception.

Conflict of interest

The authors report no conflict of interest relevant to this manuscript.

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